IN THE CLAIMS:

1. *(currently amended)* An apparatus for generating high-power femtosecond optical pulses, the apparatus comprising

a femtosecond pulse source;

a phase conditioning optical dispersive element coupled to the output of the femtosecond pulse source, the dispersive element having predetermined ~~characterized~~ characteristics chosen to produce a pulse with a desired phase;

a rare-earth doped fiber amplifier coupled to the output of the dispersive element, the rare-earth doped fiber amplifier comprising: a second of rare-earth doped single mode fiber of a predetermined length, at least one source of optical pump power, and at least one wavelength division multiplexer for introducing the output of the at least one source of optical pump power and the output of the dispersive element into the section of rare-earth doped fiber; and

an output section of single mode fiber fused to the output of the rare-earth doped fiber amplifier, the output section of single mode fiber used to compress the output optical pulses from the rare-earth doped fiber amplifier.

2. *(original)* The apparatus as defined in claim 1 wherein the rare-earth doped fiber amplifier comprises an erbium-doped fiber amplifier.

3. *(original)* The apparatus as defined in claim 1 wherein the femtosecond pulse source comprises a modelocked rare-earth doped fiber laser.

4. *(original)* The apparatus as defined in claim 3 wherein the modelocked rare-earth doped fiber laser comprises a modelocked erbium-doped fiber laser.

5. *(original)* The apparatus as defined in claim 1 wherein the phase conditioning optical dispersive element comprises an input section of single mode fiber.

6. *(original)* The apparatus as defined in claim 5 wherein the input section of single mode fiber comprises a length of at most two meters.

7. *(original)* The apparatus as defined in claim 1 wherein the phase conditioning optical dispersive element comprises a Bragg grating.

8. *(original)* The apparatus as defined in claim 7 wherein the Bragg grating comprises a fiber Bragg grating.

9. *(original)* The apparatus as defined in claim 8 wherein the fiber Bragg grating comprises a tunable fiber Bragg grating.

10. *(original)* The apparatus as defined in claim 1 wherein the rare-earth doped fiber amplifier comprises a pair of co-propagating pump sources and a pair of counter-propagating pump sources.

11. *(original)* The apparatus as defined in claim 10 wherein the pair of co-propagating pump sources generate orthogonally polarized pump signals and the fiber amplifier further comprises a polarization combiner for combining the orthogonally polarized pump signals onto a single section of polarization maintaining fiber, the output of the single section of polarization maintaining fiber applied as a first input to a wavelength division multiplexer, the output of the dispersive element applied as a second input to the wavelength division multiplexer.

12. *(original)* The apparatus as defined in claim 10 wherein the pair of counter-propagating pump sources generate orthogonally polarized pump signals and the fiber amplifier further comprises a polarization combiner for combining the orthogonally polarized pump signals onto a single section of polarization maintaining fiber, the output of the single section of polarization maintaining fiber applied as a first input to a wavelength division multiplexer so as to provide the pair of orthogonally polarized pump signals as a counter-propagating input along the fiber amplifier.

13. *(original)* The apparatus as defined in claim 1 wherein the output section of single mode fiber comprises a length less than 50 cm.

14. *(original)* The apparatus as defined in claim 1 wherein the section of rare-earth doped single mode fiber of the fiber amplifier comprises a length of less than five meters.

15. *(original)* The apparatus as defined in claim 14 wherein the length of the erbium-doped single mode fiber is at most two meters.

16. *(original)* The apparatus as defined in claim 1 wherein the at least one source of optical pump power provides a pump signal at a wavelength of 1480 nm.

17. *(original)* The apparatus as defined in claim 1 wherein the at least one source of optical pump power provides a pump signal at a wavelength of 980 nm.

18. *(original)* The apparatus as defined in claim 1 wherein the dispersive element, rare-earth doped fiber amplifier and output section of single mode fiber all comprise polarization maintaining fiber.